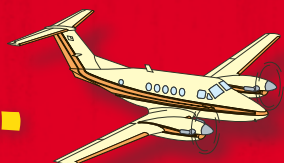


# Imagine being a pilot...



# Start your engines!

## Things you can do to learn more:

- Attend an airshow and meet the pilots
- ND aviation at [www.nd.gov/ndaero](http://www.nd.gov/ndaero)
- Visit your local airport's flight instructor
- AV Kids at [www.avkids.com](http://www.avkids.com)
- EAA Young Eagles at [www.youngeagles.com](http://www.youngeagles.com)
- NASA Connect at [www.connect.larc.nasa.gov](http://www.connect.larc.nasa.gov)
- UND Aerospace at [www.aero.und.edu](http://www.aero.und.edu)



**North Dakota Aeronautics Commission**  
 PO Box 5020  
 Bismarck, ND 58502-5020  
<http://www.nd.gov/ndaero>  
 701-328-9650



**North Dakota**  
 Aeronautics Commission

# Want to be a pilot?

- Learn to fly at [www.beapilot.com](http://www.beapilot.com)
- Call local airport flight school for introductory flight
- Complete ground school and flight training courses
- You can fly at any age but must be age 16 to solo
- Join the Civil Air Patrol starting at age 12 in North Dakota at [www.ndwg.cap.gov](http://www.ndwg.cap.gov)



- **Altitude Indicator (glass)**—shows if the plane is turning, climbing or descending
- **Vertical Speed Indicator**—tells you how quickly you're climbing or descending
- **Heading Indicator**—compass
- **Airspeed Indicator**—shows the speed of the airplane
- **Attitude Indicator**—shows if the plane is pointed up, down or turning
- **Altimeter**—shows how many feet high the plane is flying above sea level

# Basic instruments.

## What do all those dials and symbols mean?

Every cockpit contains an instrument panel with six basic tools that help the pilot fly the plane. In some planes, the instrument panel looks like gauges on the dashboard of your car. In others, it looks like screens from a Star Wars movie. No matter what it looks like, every instrument panel presents the same basic information.

# How is a plane controlled?

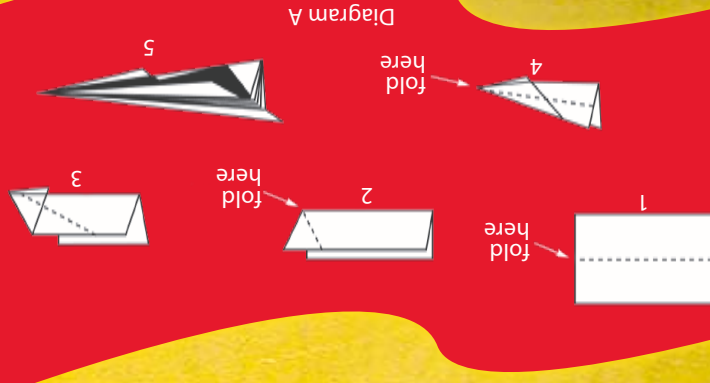
To control which way a plane turns and moves in the air and on the ground, a pilot moves parts of the wings and tail called control surfaces. The control surfaces are the ailerons, rudder, and elevator. You can see these in action by using folded paper gliders.

**EQUIPMENT:** a sheet of paper and a paper clip.

**Folded paper glider:** Fold a piece of paper following diagram A. You can use a paper clip to hold together the finished glider at the bottom. You can also use the paper clip for balance on the airplane. Experiment with the glider, moving the clip up or back as needed to get it in balance.

**Up and Down:** Fold the back edges of the paper glider up, as in diagram B. When you throw the glider, the tail should go down and the nose should point up. It may take some practice to get the controls set so the glider does what you want it to do.

When the pilot wants the plane to climb, they move the airplane controls so that the elevator tilts up in the same way that you folded the back edges of the glider. The air hitting the elevator pushes the tail of the plane down, tilting the nose upward, so that the plane can climb.



**Right and Left:** Turn the vertical fin on the glider a little to the right. This will make the glider fly toward the right as in diagram C.

The pilot moves the airplane's rudder to the right for a right turn, but must also bank the plane for the turn, the same as you would do if you were turning on a bicycle. (You would lean to the right for a right turn.)

The pilot tilts the plane to one side by using the ailerons. When one tilts up, the other tilts down. To tilt the plane to the right, the pilot tilts the left aileron down so the left wing is pushed up. The right aileron is tilted up so the right wing will be pushed down. You can do the same thing with a paper glider. For a left turn, the pilot reverses the process described above.



# Careers in aviation

There are hundreds of careers in the aviation industry—in the air or on the ground. Here are some examples:

### In the air...

- Airline pilot
- Emergency medical helicopter
- Corporate air jet charter
- Airborne law enforcement
- Surveying and aerospace mapping
- News and traffic reporting
- Ag aerial spraying
- Pipeline patrol flying
- Aerial firefighting
- Military flying

### and on the ground...

- Air traffic control
- Operations
- Flight dispatch
- Airport manager
- Flight attendant
- Aircraft mechanic

# Papa. India. Lima. Oscar. Tango.

(That’s aviation-speech for “pilot.”)

In order to clearly communicate, pilots and air traffic controllers spell out words using a phonetic alphabet. See if you can learn it!

A	Alpha	N	November
B	Bravo	O	Oscar
C	Charlie	P	Papa
D	Delta	Q	Quebec
E	Echo	R	Romeo
F	Foxtrot	S	Sierra
G	Golf	T	Tango
H	Hotel	U	Uniform
I	India	V	Victor
J	Juliet	W	Whiskey
K	Kilo	X	X-ray
L	Lima	Y	Yankee
M	Mike	Z	Zulu

# Don't be a drag!

### What keeps an airplane in the air?

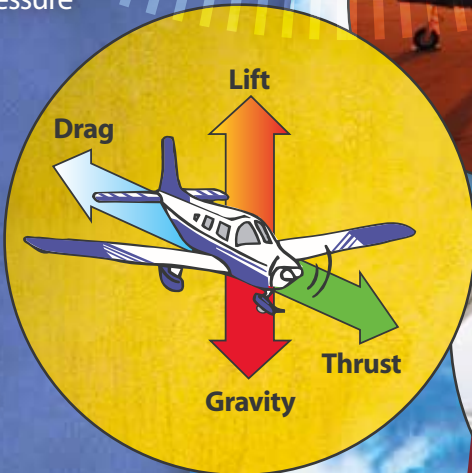
It’s really quite simple. An airplane in flight is the center of a continuous tug-of-war between four forces: **lift, gravity, thrust and drag**.

**Gravity** affects an airplane just as it does a person.

**Lift** overcomes gravity and allows the airplane to fly. Lift is created when the forward motion of the plane sends air flowing around the wing. Because the wing is curved, air flows over the top of the wing faster than the flat underside. The difference in air speed and pressure produces lift.

**Thrust** generated by the engines moves the plane forward.

**Drag**, or air resistance, is the opposite of thrust. Drag helps limit the speed of the aircraft and allows it to slow down while landing.



*Taking the controls of an aircraft is a thrill!!*



# Parts of an airplane

